Factors affecting the thermophysical properties of nanofluids

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

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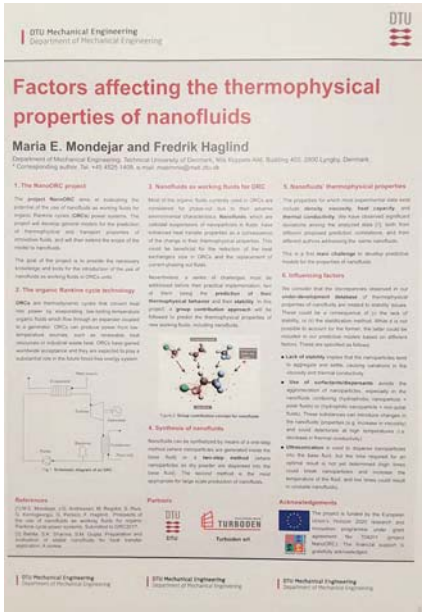
Nanofluids are colloidal suspensions of nanoparticles in industrial fluids, such as refrigerants or working fluids, which exhibit enhanced thermal properties. In the last few years, the potential use of nanofluids in refrigeration processes and organic Rankine cycle units has attracted great attention as a way to improve their performance. However, the research on nanofluids is still at its earliest stage and a number of challenges must be addressed prior to their practical use in industry. One of these challenges concerns the prediction of their thermophysical behavior, which is highly dependent on a number of parameters, such as the nanoparticle concentration, and their type, size, or shape. Moreover, based on the study of currently available experimental data of thermophysical properties of nanofluids, it has been observed that the preparation method of the nanofluid could significantly affect the measured properties. In this work we present the project NanoORC, which aims to study the potential of nanofluids as working fluids for organic Rankine cycles. The nanofluids preparation methods, including use of surfactants, and stabilizing and homogenization methods, are briefly described, and their effect on the nanofluid stability and thermophysical properties is discussed.



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